Claims

1. (original) A method comprising:

forming a model of multi-dimensional spectroscopic information including at least one set of two or more mutually exclusive terms, the set of terms formed from at least first and second multi-dimensional spectroscopic data sets of a dimension less than the modeled multi-dimensional information,

selecting only one of the set of mutually exclusive terms to represent the multi-dimensional spectroscopic information by fitting the model to a third multi-dimensional spectroscopic data set.

2. (original) The method of claim 1 wherein the first and second data sets share a common dimension and the second data set has at least one dimension orthogonal to a dimension in the first data set.

3. (original) The method of claim 2 wherein the orthogonal dimensions are frequency dimensions and wherein the set of mutually exclusive terms include frequency and decay rates determined from the first and second data sets.

4. (original) The method of claim 1 further comprising representing the multi-dimensional information with a model including only the selected term of the set of mutually exclusive terms.

5. (original) The method of claim 1 wherein the set of mutually exclusive terms include frequency and decay rates determined from the first and second data sets.

6. (original) The method of claim 5 wherein the first and second data sets are of dimension one less than the third data set.

7. (original) The method of claim 6 wherein the third data set is an NMR spectrum.

8. (original) The method of claim 7 wherein the third data set is a protein NMR spectrum.

9. (original) The method of claim 1 wherein the third data set is obtained at lower resolution than the first and second data sets.

10. (original) The method of claim 1 further comprising: obtaining peak frequencies and associated decay rates from the first and second data sets, and forming the set of mutually exclusive terms with the obtained frequencies and associated decay rates.

11. (original) A method of analyzing a physical object comprising:

providing a series of stimuli to the object and determining the response of the object to the series of stimuli,

varying the times between the stimuli in the series to form at least first and second multi-dimensional data sets of the response of the object to the series of stimuli,

forming a model of multi-dimensional information of a dimension higher than the dimension of the first or second data sets, the model including at least one set of terms where each term in the set represents a potential correlation between features of the first and second data sets,

determining which term in the set represents the actual correlation between features of the first and second data sets by comparing the model to a third multi-dimensional data set.

12. (original) The method of claim 11 wherein the features of the first and second data sets include frequency and decay rates.

13. (original) The method of claim 11 further comprising representing the multi-dimensional information with a model including the term determined to be representative of the correlation of features.

14. (original) The method of claim 11 wherein providing the series of stimuli and varying the times between the stimuli include performing a multi-dimensional NMR analysis of the object.

15. (original) The method of claim 11 wherein the formed model includes a plurality of sets of terms, and the method further comprises selecting one from each of the sets of terms to represent the actual correlation of features in the first and second data sets.

16. (original) The method of claim 11 wherein the object is a protein.

17. (original) The method of claim 16 wherein the protein is a heteronuclear labeled protein.

18. (original) A device comprising: a computer readable media containing programming instructions for a multidimensional interrogation device, the instructions operable to cause the multidimensional interrogation device to: form a model of multi-dimensional interrogation information including at least one set of terms where each term represents a potential correlation between features of at least first and second multi-dimensional data sets, the first and second data sets of a dimension less than the modeled information, and determine which term represents the actual correlation between features of the first and second data sets by comparing the model to a third multi-dimensional data set.

19. (original) The device of claim 18 wherein the instructions are operable to cause the interrogation device to fit the model to the third multi-dimensional data set to determine which term represents the actual correlation between features.

20. (original) The device of claim 19 wherein the features of the first and second data sets include peak frequencies and associated decay rates.

21. (original) The device of claim 18 wherein the computer readable media is selected from the group consisting of floppy disks, magnetically encoded hard disks, tapes, cartridges and optical disks.

22. (original) The device of claim 21 wherein the multi-dimensional interrogation device includes a multi-dimensional NMR machine.

23. (original) The device of claim 22 wherein the features of the first and second data sets include peak frequencies and associated decay rates of multi-dimensional NMR data sets.

24. (original) A method comprising: forming at least one set of terms from at least first and second multi-dimensional spectroscopic data sets wherein each of the terms in the set is representative of potential correlations between features in the first and second data sets, determining which of the set of terms represents the actual correlation between features of the multi-dimensional data sets by comparing the model to a third multi-dimensional spectroscopic data set, representing multi-dimensional spectroscopic information with the determined term.

25. (original) The method of claim 24 wherein determining which term represents the actual correlation between features includes fitting the model to the third multi-dimensional data set.

26. (original) The method of claim 24 wherein the features of the first and second multi-dimensional data sets include peak frequencies and associated decay rates.

27. (original) The method of claim 24 wherein the at least first and second multi-dimensional spectroscopic data sets include NMR data sets.

28. (original) The method of claim 27 wherein the NMR data sets are data sets from NMR analysis of biological material.

29. (original) The method of claim 24 wherein the third data set is obtained at lower resolution than the first and second data sets.

30. (original) An apparatus comprising: a device carrying logic to: form a model of multi-dimensional information wherein the model includes at least one set of terms where each term represents a potential correlation between features in at least first and second multi-dimensional data sets of a dimension less than the modeled information, select one of the set of terms for representing the multi-dimensional information by comparing the model to a third multi-dimensional data set.

31. (original) The apparatus of claim 30 wherein the device also carries logic to determine the features in the first and second data sets.

32. (original) The apparatus of claim 30 wherein the device is a computer readable memory device.

33. (original) A method for determining multi-dimensional information concerning an object, comprising: forming first and second multi-dimensional data sets representing projections of information concerning an object of a dimension one higher than the first and second data

sets; correlating the first and second data sets to form a model of the multidimensional information concerning the object, the model including at least one set of terms where each term in the set represents a potential correlation between features in the first and second data sets; determining which of the terms represents the actual correlation of features in the first and second data sets by comparing the model to a third multi-dimensional data set representing information concerning the object.

34. (original) The method of claim 33 wherein the third data set is obtained at lower resolution that the first and second data sets.

35. (original) The method of claim 1 wherein fitting the model to a third multi-dimensional data set includes extremizing an error term quantifying the difference between data from the third data set and the modeled multi-dimensional spectroscopic information.

36. (original) The method of claim 35 wherein fitting the model includes performing a linear least squares fit.

37. (original) The method of claim 11 wherein the term representing the actual correlation between features of the first and second data sets is determined by minimizing a term quantifying the difference between data from the third data set and corresponding output of the modeled information.

38. (new) A method comprising:

obtaining a first multi-dimensional spectroscopic data set and a second multi-dimensional spectroscopic data set having a predetermined dimension;

identifying a set of two or more mutually exclusive terms based on the first data set and the second data set;

forming a model of multi-dimensional spectroscopic information including the set of two or more mutually exclusive terms;

obtaining a third multidimensional spectroscopic data set having the predetermined dimension;

fitting the model to the third multi-dimensional spectroscopic data set; and

selecting only one of the set of mutually exclusive terms to represent the multi-dimensional spectroscopic based on the fitting.